REPORT

ON THE

HORTICULTURAL GARDENS, LUCKNOW,

FOR THE YEAR ENDING 31ST MARCH, 1882.

No. $\frac{860A.}{II.}$ OF 1882.

FROM

W. C. BENETT, ESQ.,

DIRECTOR, DEPT., AGRI. AND COMMERCE, N.-W. P. AND OUDH,

TO

THE SECRETARY TO GOVERNMENT,

NORTH-WESTERN PROVINCES AND OUDH.

Dated Naini Tal, the 30th June, 1882.

SIR,

I HAVE the honor to submit Mr. Ridley's report on the management of the Horticultural Gardens at Lucknow, for the year ending 31st March, 1882.

2. The sanctioned grant for the year was Rs. 13,500, which included Rs. 3,000 for the Superintendent's pay. The whole of this was spent. The receipts amounted to Rs. 9,554-10-3, and there was besides a credit to the gardens of Rs. 37-2-6, making a total of Rs. 9,591-12-9. The estimated receipts were Rs. 9,500, so that the estimate was slightly exceeded. Rs. 108, on account of interest on Government notes, was not drawn. As this is a certain receipt, it should be added to the above total in comparing the results of 1881-82 with those of previous years. This is done in the following table :—

Year.	Interest on notes.	Rent of land.	Subscriptions.	Sales of produce, &c.	Total.
	Rs.	Rs. a. p.	Rs.	Rs. a. p.	Rs. a. p.
1878-79	...	...	...	.	8,901 6 5
1879-80	108	376 13 0	348	8,356 11 3	9,189 8 3
1880-81	108	339 11 6	352	9,755 2 9	10,554 14 3
1881-82	...	443 8 0	300	8,811 2 3	9,554 10 3
	...	Add interest on notes ...		...	108 0 0
					9,662 10 3

Besides the produce for which full cash values were realized, fruits and flowers were supplied gratis or at half price which, if their full value were added, would increase the realizations by Rs. 486-1-0. The net cost to Government has therefore been Rs. 3,837-5-9, which is little more than the Superintendent's salary. Considering their extent and the work they transact, these gardens are by far the most cheaply administered of any of which I have knowledge.

3. The chief items in which the receipts show a falling off are the following :—

	Rs.
Subscriptions	52
Sale of fruit trees	181
Imported vegetable seed	200
Acclimatised flower seed	157
Cut fruit	354

As explained by Mr. Ridley, the season was responsible for the principal of of these losses. On the other hand the receipts from the sale of acclimatised vegetable seeds showed an increase of Rs. 100. The falling off in subscriptions is a matter for regret.

4. In reviewing the report for 1879-80 Government approved of the proposal that the Superintendent of the garden should be allowed to visit other public gardens, with the object of securing a ready communication of the experience acquired in different localities. This permission was acted on during the past year, and Mr. Ridley visited the Agra and Saháranpur gardens in December last. A small cost to the State in travelling allowance is probably more than repaid by the practical benefits which may be expected.

5. A few experiments were made beyond the domain of horticulture proper in crops which may be of use for general field cultivation. Round barley was sown chiefly for its seed and produced the heavy crop of more than 35 bushels of clean grain to the acre. Two varieties of maize, the eight-rowed sugar and Mammoth sugar, were grown with success, and the failure of two other kinds was probably due to their having been sown at the wrong season. Seeds of a hitherto untried variety of sorghum, known as the Egyptian rice corn, and of the Tamboki grass, which promises well as a fodder crop, were raised in the garden and will be further experimented with.

6. *Fruit.*—Mangoes failed completely. They had so much exhausted themselves by excessive flowering in the year before that, though that crop of fruit had been partially destroyed, they had not the strength to produce flowers again this season. The profits from the joint cultivation of mangoes and pine-apples, in spite of a good crop of the latter, fell from Rs. 80 to Rs. 20 to the acre.

Several varieties of late-fruiting mangoes were tried, of which one only, the Fakhira, which ripens as late as the end of July, is pronounced a success.

Mr. Ridley continues to express an unfavorable opinion of the new system of grafting by tying seedlings on to the branches of trees, but his experience is contradicted by that of the large and important mango garden at the Cawnpore Farm. It is found there that when one-year-old seedlings are used, the considerable but not excessive fatality which is incidental to this form of propagation is more than compensated for by its greater cheapness and ease.

7. Very little additional information was obtained in the case of oranges and limes. The order of merit in which the several varieties were arranged last year has been found to hold good. Attempts were made to improve the fruit by planting on trenched land and to produce new varieties by hybridization. The results will be reported when the experiments are more mature.

8. As the old vines are apparently effete, they are being replaced by younger plants; but neither young nor old produced this year any crop worth speaking of. Foreign varieties were inarched on country stocks, and a number of new kinds, for which the analogy of past experience holds out a good prospect of success, have been imported from Europe. A few trees were covered in with muslin, but Mr. Ridley finds it difficult to decide whether the advantages or disadvantages of this plan predominate.

9. Good fruit was obtained from the Arabian date, and no mention is made of the usual complaint that it ripens too late to avoid spoiling by the rains. It

is generally found advisable to pick the fruit as soon as the rains set in and allow it to mature under cover.

Two varieties of the African date have been raised from seed.

In the moist districts to the north of the Gogra it is found advantageous to lay bare the roots of peach trees for a short time during the cold weather. The dryer soil, or some defect in the operation, has proved fatal to the majority of the trees treated in this way at the Horticultural gardens, and not improved the fruit of the survivors.

10. The profits of fruit culture, though considerably below those of last year, contract favorably with the gains from ordinary field cultivation, and omitting the vines, which proved a complete failure, ranged from Rs. 7-4-9 per acre in the case of Malta lemons to more than Rs. 66 in the case of leechees; the average profit per acre on all kinds of fruit, having been more than Rs. 34.

11. *Vegetables.*—The trials with cattle carrots contradicted the usual experience of the deterioration of acclimatised root seeds. Seeds which had been acclimatized for two years gave 50 per cent. more produce than newly-imported and 30 per cent. more than one-year-old seed. The common defect of premature flowering was not obviated and the experiment was far from being conclusive; but it yields some hope of the successful introduction of what may prove a valuable addition to the food and fodder resources of the country. The yield (915 maunds to the acre) of two years' acclimatized seed was very considerable.

It was shown that some of the country vegetables, and especially those of the gourd family, are capable of improvement by selection.

Experimental sowings were made with several varieties of American gourds and melons and of the Chinese Sooly-Qua gourd, but without encouraging results. The season was against them. New kinds of English vegetables were more successful, particularly a cauliflower which is likely to command favor in the native market. In the distribution list cauliflowers maintain an easy lead, and the increased demand for acclimatized seed, when the demand for almost every other produce fell off, is most satisfactory.

12. *Flowers.*—Three new species of annuals were acclimatized during the year, and seedlings of Hippeastra were raised of such unusual beauty that Mr. Ridley is convinced that their bulbs would command high prices in the English market. The subject of the export of produce to England is a new one, which Mr. Ridley will be encouraged to take up.

The acclimatisation of flowers has proved so successful that it is to be regretted that public gardens do not indent for their supplies more generally on Mr. Ridley. The demand for the very beautiful roses grown at Lucknow was so great that it was found impossible to satisfy it. The stock is being increased.

13. *Arboriculture: Exotics.*—Carobs continue to be a source of disappointment. The older trees die out, and it is found impossible to raise others.

Eucalypti give more reasons for satisfaction. Three new varieties—diversicolor, ficifolia, and carynocalix—have been raised, and the latter promises to be a valuable fodder tree.

14. *Arboriculture: Nursery.*—A separate grant of Rs. 1,744, independent of the budget for the gardens, was made to enable Mr. Ridley to maintain a nursery for the supply of roadside trees to the Deputy Commissioners of neighbouring districts.

It has proved a failure, probably on account of the expense and risks of transport. The subject falls more properly under the head of the general arboriculture of the province, and need not be treated in detail in a review of the administration of the Horticultural Gardens.

15. *Apprentices.*—An attempt has been made to supply the widely felt want of trained malis to take charge of private and public gardens by the entertainment and instruction of a limited number of apprentices. Out of a sanctioned number of 16, 14 boys are now on the list, and Mr. Ridley proposes to fill up the two vacancies immediately. He reports that the boys are doing well and progressing in their education, but makes no mention of any applications for their services. It is possible that their existence is not sufficiently well known.

16. The annual flower show held in connection with the gardens on March 2nd was the best that has been known. The time of year was against any large exhibition of fruit, but flowers and vegetables were well represented. It is a matter for satisfaction that the show of the latter proved that native malis are beginning to pay more attention to quality than to size—a good result, which may fairly be attributed to the influence of these exhibitions. The show paid another tribute to Mr. Ridley's economical management by costing nothing but a sum of Rs. 50 contributed by the municipality.

17. It is to be hoped that, in spite of the slight falling off in income, the results of the year will not be considered unsatisfactory. As a centre for the distribution of improved varieties of all kinds of horticultural produce, and a field for the prosecution of experiments in the introduction of new kinds both of plants and of cultivation, the gardens at Lucknow discharge most useful functions, and their cost to Government is exceedingly small.

I have the honor to be,

SIR,

Your most obedient servant,

W. BENETT,

Director of Agriculture and Commerce.

Report on the Horticultural Gardens, Lucknow, for the year ending 31st March, 1882.

I.—Fruit culture.

1. For the purpose of reference and comparison it seems desirable to take the fruit trees in the same order as they are mentioned in previous reports. Oranges therefore come first.

Oranges.

2. All, however, I have to record regarding them is, that there was nothing sufficiently remarkable during the past year to call for the special notice of any particular kind, or to justify any change being made in the order of merit in which the various kinds cultivated in the garden have previously been placed. At present all kinds promise a good crop, with the exception of cintra and mandarin.

Mangoes.

3. Last year I had to record a poor mango crop. This year I regret to say it is still worse, there being very little fruit on any of the trees. Last year the failure was through blight destroying the blossom; this year scarcely any blossom appeared. I attribute this to the excessive flowering noted last year, which appears to have exhausted the trees beyond the power of again blooming this year. Most of the trees have produced a free new growth, and with a year's rest, I have no doubt, they will recruit and be in a condition to fruit next year. I am sorry to say a good many of the Malda trees are in a rather unhealthy condition, and some I fear will die out. The cause of this is, I think, chiefly owing to the bad seasons experienced for the last few years and also partly to bad soil.

Pineapples.

4. Under most of the mango trees pineapples are planted: their cultivation in this way is very successful, as the trees afford the necessary shade and shelter from sun and frost which the plants require. Although it has not been possible to give any special cultivation, the results are very satisfactory—a considerable quantity of good sized fruit being yearly obtained.

(*a*) *Improvement of indigneous or acclimatized kinds.*

Oranges on trenched ground.

5. As the whole of the plot of ground trenched for the Malta oranges was not taken up with the 12 plants of that variety which were planted on it last year, I thought it a good opportunity of giving the other kinds in the garden a trial in better ground than they have yet been planted in (at least in this garden), and accordingly planted out a line of the following in July last:—

Sylhet	... 7 plants.	Nagpore	... 6 plants.
Seville	... 6 ditto.	Kewla	... 8 ditto

These, like the Malta plants, are all worked on sour lime stocks, and are therefore a complete set and additional to those planted in preceeding years. The results will be carefully watched and recorded.

Oranges worked on Seville stocks.

6. A second and separate plot was also trenched and prepared for a set worked on Seville stocks: in August, when the ground had sufficiently settled, it was planted up with the following:—

Malta	... 4 plants	Sylhet	... 4 plants.
Nagpore	... 4 ditto.	Malta ...	... 2 ditto.
Kewla	... 4 ditto.	Blood orange	... 2 ditto.

Malta lemon stocks.

7. The efforts made to bud oranges on the Malta lemon stocks raised from layers were, I regret to state, unsuccessful. None of the buds inserted took. This year seedlings are being tried with buds of the Malta lemon and Malta orange; as seedlings are more vigorous than layers, better results are likely to be obtained.

Pummelow stocks.

8. The two plants of Kewla worked on pummelow stocks and which were planted in 1878 fruited this year. The fruit was carefully examined and tested at different stages of ripeness, and also compared with fruit from trees worked on the common sour lime, but no difference of any kind could be detected: it was perfectly clear that up to that time the stocks had not affected the character of the fruit in any respect. The effect of this stock in promoting and maintaining healthy growth are points for future observation.

9. The two seedling hybrids raised last year are still alive, but as they have made very slow growth, it has not been possible to obtain buds from them yet.

Hybridising.

10. When in flower a considerable number of flowers of all kinds were carefully cross-fertilized, and as a number of these flowers have developed fruit, and which as yet is safe. I am hopeful that this year's labour in this direction will yield better results than any that have hitherto been obtained.

11. The old vines are making better growth this year, but are again bearing a very poor crop. This applies more particularly to the country kinds, but partly also to the black Hamburghs, which are yielding less than they have done for the last two or three years. As all efforts made to improve the condition of these old vines have been fruitless, it was decided to uproot and replace them by degrees with young plants. This work was commenced during the year, and about one-third of the area covered by the old vines has been replanted with young ones.

Vines.

12. The two principal faults of the old vinery have been remedied, *first*, by planting in raised and well prepared borders, and *secondly*, by running the lines from north to south. It will, I think, be as well to leave the rest of the old vines till the new ones begin to fruit.

13. A number of foreign kinds were inarched upon country kinds and *vice versâ;* but none of them have done very well; and as they are not well established yet, they will not be detached till the rains. I hope to be able to inarch more plants this year.

Improvement by grafting.

14. The experiment of covering up vines when in fruit with muslin, with the object of ascertaining if the fruit could be improved by so doing, was tried on three vines, *viz.*, one country (white), one Bombay (red) and one black Hamburgh; this was done when the fruit was about one-third grown. A light wooden frame-work, standing clear of the vines about two feet all round, was first run up, and over this moderately strong muslin was placed, drawn tight and tacked to the frame-work. The results were as follows :—

Improvement of the fruit by covering with muslin.

15. The fruit was a little later in ripening. The berries were thinner skinned and tenderer than those uncovered, but had not quite such a sweet flavour. There was no appreciable improvement in size, but the bunches had a clean and finished appearance.

16. The covering moreover proved a most effective protection against the ravages of birds and insects, scarcely a berry on the three vines was injured. Placing, however, the advantages against the cost, I do not think this method of growing grapes can be recommended for general adoption; but where fine-looking fruit is valued and expense not a consideration, it might be adopted, as the deterioration in flavour was not so great as to render the fruit at all unpalatable.

17. The vines on ridges are making a little better growth this year, but are still below my estimate of what they should be. Their slow progress since planting is no doubt principally owing to the bad season experienced since then.

New vinery.

18. Of the five trees first operated upon two only remain, a third having died during the year, and the ill effects of this treatment are further apparent this year, in the fact of the two surviving trees yielding very little fruit, while the rest in the orchard are bearing a fairly good crop. There was certainly no improvement last year in the fruit grown on these trees. The results obtained so far all go to prove this method of treating peach trees to be unsuited to this part of India. In a moist climate or a damp soil such a plan of checking and restricting over luxuriance may perhaps be advantageously followed: but in this part of India the dry season which follows the rains and the low temperature of the winter months render such treatment unnecessary, as growth is naturally arrested sufficiently to allow of the necessary hardness and ripeness of the wood being effected before growth again begins.

Exposing the roots of peach trees.

19. The seedling Bhadunia mangoes have made such slow growth that it has not been possible to get scions grafted upon them yet. A few of the largest were however selected and attached, and which I hope will be ready to plant out in the rains.

Mangoes.

20. The variegated mango seedling mentioned in last year's report has been successfully grafted upon a common seedling and still maintains its variegation.

New system of grafting.

21. The system of grafting by hanging small seedlings on to the trees was again tried this year, but with no better success than was gained last.

As new seedlings were not available early owing to the lateness of the rains, a number of one-year old seedlings were tried: they were carefully dug up with a fair amount of soil attached to their roots, which were at once bound up with grass. In addition every possible advantage was given by attaching them in the most sheltered and shady parts of the trees where good scions were available; the grafting was done by experienced hands, and frequent syringing was used to keep the plants moist. Still, notwithstanding all the consideration and care bestowed, the results were most unsatisfactory, as less than one-third of the number attached were successful. The season was of course against success, but after making due allowance on that score, no grounds exist entitling this system to be called superior to the old one, seeing that both fewer and smaller plants are the results.

22. Small seedlings were also tried, but with no better success than with the older ones.

Arabian date palms.

23. This year a greater number of the Arabian date trees fruited than in any preceding year. Some of the bunches were of good size and yielded very good fruit; the size, shape, and color of these proved the trees in the garden to be a collection of several different varieties; the colors were mostly shades of dark red and yellow, while the shapes ranged between oblong and oval of different sizes. Seed of the different kinds was secured and sown, the fruit being sold to a contractor. There is a large stock of seedlings on hand, but I regret to say none of the off shoots put down succeeded.

Bers.

24. The eight plants put down last year are doing well and yielded a little fruit this year, but on carefully examining it, no improvement was observed. This I think cannot be expected till the trees have been longer under cultivation and treatment. A little pruning to keep the trees in shape was all that was necessary this year.

25. A few plants of other kinds than those already planted are coming on, but they were not sufficiently established to admit of their being put out.

26. I should regard it as a great favour if any one having good kinds would be so good as to send in season samples of ripe fruit, the name should be given; and to keep the fruit from getting bruised, it should be sent in a small box or basket. Any charges incurred in forwarding would of course be refunded.

27. Possibly, in the same way, superior kinds of other fruits besides bers might be brought to notice with much advantage.

Cultivation of fruit trees: Profit and Loss.

28. Table showing the expenditure and receipts per acre attending the cultivation of several orchard fruits:—

Name.	Cost per acre.	Value realized per acre.	Profit per acre.	Loss per acre.	Remarks.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
Peach	54 11 0	111 9 9	56 14 9	..	
Vines	74 14 6	...	...	74 14 6	Crop failed.
Alubokharas	18 5 9	59 4 0	40 14 3	...	
Pummelows	16 9 6	71 12 0	55 2 6	...	
Malta lemons	34 0 3	41 5 0	7 4 9	...	
Mangoes and pineapples ...	25 0 0	45 0 0	20 0 0	...	Mango crop poor; pineapples good.
Leechees	13 3 3	80 0 0	66 12 9	...	Good crop.
Malta oranges	22 5 3	46 10 3	24 5 0	...	
Cintra „	35 7 3	61 1 9	25 10 6	...	A number of sylhet trees are planted among the cintras.
Mandarin „	38 8 6	50 6 9	11 14 3	...	A number of kewla trees are planted among the mandarins.

Strawberries.

29. Planting strawberries early was tried, but owing to the early closing of the monsoon rains the experiment was a failure.

(b). Introduction of new kinds.

Mangoes.

30. The fakhira mango introduced last year is I find on enquiry a late kind. The fruit comes in about the middle of July after most kinds have ripened ; this is of course a valuable quality, and in addition the fruit is good both in size and flavour. Ripe fruit of other kinds were tried, *viz.*, abba lubattu, Bhurtpore, abba surajmukkee, abba, benara, and khatkat. These all ripen about the same time as the fakhira, but were found to be inferior to it, and without any qualities sufficiently good to render their cultivation desirable.

31. Plants of the following kinds were received from the Agri-Horticultural Society of India :

Feroghabonnee,
Kistapul burra and payasee,

And from a local garden—

Two plants of Bijnour Safeda.
Ditto Bur Patta.

From Mr. Bartlett, Calcutta, Strawberry, Java, Gopal, Chusadhoba.

African dates.

A few plants of two varieties of African dates have been raised from seed kindly sent by Dr. Bonavia.

32. The following fruit trees were purchased and imported from Messrs. Cranston & Co., Hereford, and arrived in good condition :

Pines.

Smooth Cayenne.	Black Prince.
Moscow.	Enville Queen.
Black Jamaica.	Charlotte Rothschild.

Figs.

White Marseilles.	Asborne's Prolific.
Negro Targo.	Castle Kennedy.
Lees Prolific.	Col. de Signora Beaula.
Brunswick.	

Vines.

White Frontignan.	Barbarossa.
Black Hamburgh.	Bowood Muscat.
Alicante.	Royal Muscadine.
Duke of Buccleugh.	Foster's Seedling.
Madresfield Court.	Muscat of Alexandria.
Muscat Hamburgh.	

33. As certain kinds of the above three fruit do well in India, it seemed desirable to try and introduce some of the superior kinds grown in Europe ; possibly several of the vines could have been procured from other gardens in India, but as wrong naming very largely prevails, and the plants being intended for propagation as well as cultivation, I considered the extra cost of securing them true to name well laid out, it being a most important matter that purchasers should receive the kinds they indent for, instead of something else under a wrong name.

"Wampee" (Cookia punetata.)

34. From the Superintendent Taj Gardens, Agra, 24 plants of Wampee (Cookia punetata) were received.

(c) Distribution.

35. Compared with last year there is, I regret to say, a considerable falling off in the number of fruit trees sent out during the year. This may partly be attributed to the unfavorable character of the season which no doubt interfered with planting, and prevented larger indents being made. Of mangoes, loquats, and pineapples more could have been supplied than were asked for as stocks of all remain on hand. On the other hand, the supply of oranges, vines, pumme-

lows, alubokharas, and peaches was considerably below the demand. The short supply of these was owing chiefly to heavy failures among the budding stocks which were of course planted out the preceding rainy season, or rather what should have been the rainy season, as very little rain fell in 1881, at least in the months when these stocks are transplanted, *viz.*, July and August. Limited space for planting out stocks also partly accounts for only limited number of these fruit trees being available, this however I am glad to say will not be a complaint in the future, as two acres of land have been taken up in the Arboricultural nursery for this work.

36. The distribution of fruit trees during the year is given in the following statement :—

Name.	Total.	Sold at half price to public gardens.	Distributed gratis.	Total.
	Rs.	Rs.	Rs.	Rs.
Oranges	168	69	29	266
Mangoes	523	411	18	952
Malta Lemons	24	37	24	85
Kagzie Limes	47	...	...	47
Sour Limes	6	25	...	31
Loquats	83	16	...	99
Vines	107	...	...	107
Leechees	30	...	...	30
Peaches	30	...	...	30
Pinoapples	32	100	...	132
Plantains	54	6	...	60
Pummelows	7	...	...	7
Alubokharas	3	...	...	3
Jack-fruit	4	6	...	10
Guavas	6	...	...	6
Pears	12	...	...	12
Aloochas	4	...	...	4
Ardunia grandiflora	2	...	...	2
Total ...	1,142	670	71	1,883

37. The receipts by sale of fruit trees during the year were Rs. 765-6-9, being Rs. 181-7-3 less than last year.

38. The cash loss to the garden for the fruit trees sent out at half price amounts to Rs. 128-15-0, and Rs. 11-2-0 for those distributed gratis ; these two items added to the actual receipts makes the total value of the year's distribution Rs. 905-7-9.

39. In addition to those mentioned in the above statement, 484 mangoes grafted on the new system were sent out. The value of these is included in the Rs. 765-6-9 above given.

II.—Vegetable and farm culture.

40. As in preceding years a good kitchen-garden was got up in the cold season, and a quantity of all the principal English vegetables were grown ; cultivation on the most approved methods was followed for the instruction of the apprentice boys.

Migbaree.

41. For the purpose of furnishing specimens for identification, a small quantity of a grain known in the Mirzapur district as *mijhri* was grown. Specimens were duly forwarded to Kew where they were identified as Panicum miliare, *Lin.* Specimens of another grain which came up among the above crop were also sent and idnentified as Panicum colonum, *Lin.* This is known here as " dhairur."

(*a*) *Improvement of indigenous or acclimatized kinds.*

White Belgian carrot.

42. With the object of proving how far it is possible to acclimatize the white Belgian cattle-carrot in this country further experimental sowings were made this year. Two and one-year acclimatized seed was tried against newly imported seed. All were sown at the same time and in contiguous plots. The respective yield per acre from each was :—

	Mds.	s.
Two-year acclimatized seed	915	36
One-year "	736	32
Newly imported "	604	16

43. I have no reasonable grounds for doubting these figures, but confess they are rather surprising—in fact, just the contrary to what were expected. In point of time the crop from new seed was somewhat favoured by being left longer in the ground than the other two, on account of its not reaching maturity so quickly as they did. The lighter yield can only be accounted for on account of the roots being further apart than was the case with the other two; the strong top growth necessitated considerable thinning, which was not necessary in an equal degree with the crops from acclimatized seed. In short, the dwarfer top-growth of these admitted of a greater number of plants being grown in the same area, with the consequent results of a greater weight yield per acre.

44. The produce from acclimatized seed showed the usual tendency to early flowering, this being greater with the crop from two-year acclimatized seed than the one from one-year acclimatized. The crop from new seed was free from this defect, and besides the individual roots were much larger and finer looking than those grown from the acclimatized seed, still the latter, as the above figures show, gave by far the greater yield.

Round barley.

45. A small plot of this was grown chiefly for the purpose of keeping up a supply of seed, for which there is likely to be a demand, as the natives appear to like this variety of barley.

46. The crop was much more luxuriant than last year's, and produced a much greater yield per acre of both grain and straw as the following figures show:—

	Mds.	s.
Clean grain per acre	26	12
Straw „	51	27

Country vegetables.

47. The cultivation of country vegetables for improvement by selection was again undertaken this year. During the hot weather nine kinds or varieties were grown. Improvement in size and shape was noticed in the following:—

Ghya taroi.	Karela.
Kukri.	Kumra.
Louki.	

48. Khira and tarbuj showed no improvement, and taroi aru was not so good as in previous years.

49. A variety of kumra with red flesh was also tried, but was found very inferior in flavour and a shy bearer.

50. In the rainy season ten kinds were grown, of which the following only were considered to show improvement:—

Kakri. | Khira.

Chachenda, black and white.

51. Mr. Bartlett of Calcutta, who received a supply of these seeds for trial last year, reports that they did not succeed well.

(*b*) *Introduction of new kinds.*

American table corn.

52. In America considerable care and attention have been bestowed in selecting and producing varieties of maize particularly suited for table use, much in the same way as peas have been selected for garden and field culture in Europe.

As maize is in much request for table use in India, it seemed highly desirable that some of the best American varieties should be tried. A supply of seed of four kinds was therefore procured, and a sowing of each duly made in the garden. The names of the four kinds were—

Extra early narragansett sugar.	Eight-rowed sugar
Early concord sugar.	Late Mammoth sugar.

53. The sowing was made on the 17th of June which proved too late for the first-named, as it was not very successful, but the cobs produced were sweet and good. The second-named kind was only fairly successful; this was probably owing to late sowing, being an early variety. The other two kinds did well, yielding good-sized cobs which were well filled up and of excellent flavor, decidedly superior to country maize for table use.

54. For the purpose of a trial sowing a small quantity of "Egyptian rice, wheat, or rice corn" was procured from America. In appearance the seed closely resembled juar, but on account of its name it was thought likely to succeed best treated as a rabi crop and was accordingly sown in October. Only a few plants came up which from the first looked more like juar than wheat, and now the grain heads have formed, its being a species of sorghum is clear. The grain appears to be maturing, and I hope sufficient may be secured to give it a trial as a kharif crop.

Egyptian rice corn.

55. Messrs. Landreth who supplied the seed state that in America the names "China corn" or "brown dowra" are also given to it in addition to the two previously mentioned. They also add,— "It is raised on a very small scale in our southern states as a forage plant, and treated by way of culture like Indian-corn. Its yield is reported to be greater and the flour inferior to wheat."

56. The plant of tambokie grass received from Saháranpur was planted out and has yielded a little seed. When sufficient is obtined a sowing will be made to ascertain its value as a forage crop.

Tambokie grass.

American vegetables.

57. The following kinds of American gourds, squashes, &c., were also tried during the year :—

Cheese pumpkin gourd.	Long green Turkey cucumber.
Coshew pumpkin.	Early frame cucumber.
Field pumpkin.	Orange water-melon.
Boston marrow squash.	Icing or ice rind water-melon.
Early white bush or patty pan squash.	

58. Three sowings of each have been made at different seasons, but so far without any good results. The first sowing was made in June after the first fall of rain. All came up well, but the plants were never very thrifty and soon died away.

59. A second sowing was made in the middle of September, and with the exceptions of patty pan squash and cheese pumpkin, which yielded a fruit or two, the results were the same as realized in the first sowing.

60. A third sowing was made in January, and at present five of the abovenamed kinds promise fairly well, but the rest have completely failed.

61. A few plants of the Chinese gourd (*Sooly Qua*) were also raised, but when about to fruit they suddenly died away. Some plants of the large bottle gourd, growing near these also failed in the same manner.

Sooly Qua.

62. Much of the non-success experienced with the above vegetables was undoubtedly owing to the abnormal character of the rainy season, the alternate spells of hot dry weather and slight falls of rain experienced, gave soft large-leaved crops like these little chance of doing well at that season (which ordinarily would have been the most favourable for most of them), and until seasons of a more regular and favourable kind are experienced, it is useless trying to introduce new kinds of vegetables like the above.

Onions.

63. The following kinds of onions were tried :—

Early white Italian tripoli.	Giant rocco.
Early red do. do.	And late red Italian.

The first two are fairly successful, but the others have failed to bulb as yet.

64. A small quantity of sea kale beet was also tried ; and in the matter of growth was successful enough. The leaf stalks are, I understand, the parts used, but as a vegetable they are not likely to meet with much favor, being very insipid when cooked ; perhaps the young sprouts when blanched and treated like sea kale may prove a better vegetable than the leaf stalks. This will be tried, and some of the plants have been cut over to see if they will sprout.

Sea kale beet.

Lettuce.

65. A lettuce named Sutton's "All Heart" was tried and proved to be an excellent variety, the heads were large, crisp, and particularly well flavoured.

66. A cauliflower named "Veitche's autumn giant" was grown for the first time and proved a great success, coming in when all the other kinds were over : late sowings continued to yield well into April.

Cauliflower.

67. When better known, I have no doubt this variety will be a favourite with native market gardeners: already I find its merits have been noted by one grower who has asked for a supply of seed. It is certain to prove a profitable crop, coming in as it does after the supply from acclimatized seed is over.

Tomato.

68. A new variety of tomato known as "Sutton's royal cluster" was also grown for the first time. It is a small round-fruited kind, with a mild and pleasant flavour; each fruit is about the size of a Cape gooseberry, and borne in clusters in the most abundant manner; it is a variety well worth cultivating.

(c) Distribution.

Imported vegetable seeds.

69. For the last two or three years there has been a decided falling off in the demand for the vegetable seeds imported by the garden. This is probably owing in a great measure to the increased facilities afforded to purchasers of procuring seeds direct from seedsmen abroad, and also to an increase in the number of vendors in India.

70. This year the demand was less than ever, and part of the stock had to be disposed of at cost price. I can only say that the seeds got out by the garden are carefully selected, both as to kind and variety, and are procured from the best seedsmen.

71. This year's sales amounted to Rs. 1,160-3-0 which is less by Rs. 200, the amount realized last year.

Acclimatized vegetable seeds.

72. There was an improvement in the demand for the acclimatized vegetable seeds. The quantity of each sent out was :—

Cauliflower, early	5 lbs.
Ditto, late	10 „
Onion, silverskin	2½ „
Cos lettuce	3 „
Tomatoes	1½ „
Spinach	¼ „

73. Of country vegetables 125 packets were sent out, for which and the above Rs. 355-2-0 were realized, being an increase of Rs. 100 over last year's receipts for the same.

74. A collection of hot weather and rain vegetable seeds was sent to the Superintendent Botanical Garden, Saháranpur.

Round barley.

To the Collector of Jaunpore, 5 seers round barley. To Rai Shiu Narain, Amroha, district Moradabad, 5 seers round barley.

A small quantity of the same was also given to four cultivators in Lucknow.

III.—Flower culture.

75. I regret to say it was not found possible to carry out the whole of the improvements mentioned in last year's report. This was owing to the labour usually available for such work being employed drawing water for a longer time than usual.

76. The border on the west side of the garden was, however, taken in hand, and has been planted with choice shrubs and trees, most of which are new to the garden.

Rosery.

77. A portion of the rosery was also levelled and improved, and got ready for planting with new stock.

(a) Improvement of indigenous or acclimatized kinds.

Hippeastrums.

78. This year the display made by the seedling hippeastrums when in bloom greatly surpassed that of preceding years, and for some weeks formed a most attractive feature in the garden. Many striking and beautiful novelties appeared, several of which were greatly superior in size, form, and color to any previously noticed, all such have been carefully marked for propagation.

79. Through the kind assistance of Dr. Bonavia a number of the best have been named and described to these. Other superior and noteworthy varieties will be added as they appear, and in time a good list will no doubt be formed.

80. The best flowers have been carefully cross-fertilized with the object of producing still better novelties.

81. In a recent number of the *Gardener's Chronicle* it was stated that there was a growing demand for this showy lily in England, and that already the supply of bulbs of the best varieties was not equal to the demand. Many of those raised in the garden would, I am certain, be much esteemed at home and as they would command a much better price than can be obtained for them here, it would be well if arrangements could be made for disposing of the surplus stock in England. Efforts will be made at an early date for doing this.

82. To the list of successfully acclimatized annuals, mentioned in previous reports, the following are added :—

Flower annuals.

Acroclinum roseum and album.	Torenia Fournieri.
Gillardia picta.	

83. The receipts by sale of acclimatized flower seeds during the year amounted to Rs. 594-6-3, which are less than last year by Rs. 157.

84. I have no doubt but that the distribution of these seeds might be greatly increased if only the public gardens in Oudh and the North-Western Provinces confined their indents to the garden instead of ordering seeds from home. The garden seeds are more certain to germinate than imported seeds, and for ordinary decorative purposes are quite as good as the latter. Home indents might be confined to superior varieties and such as do not yield seed here.

(*b*) *Introduction of new kinds.*

85. After two years cultivation, Amaranthus caudatus degenerated to such an extent as to be worthless for growing as an annual.

86. Five new kinds of balsams were grown, *viz.* :—

Double rose flowered.	Double dwarf camellia flowered.
Do. camellia flowered.	Solferino.

New carnation flowered.

87. All proved to be good varieties, the first particularly so ; they were remarkable of their large double and abundant show of flowers, and continued in bloom a long time ; they were not so healthy looking as the plants grown from acclimatized seed, but their scantier leaf growth helped to show off the flowers to greater advantage. The flowers were more double and compact than those grown from garden seed, and if they can be successfully acclimatized will be a great improvement on the old stock.

88. The following new kinds were also tried :—

Dianthus diadematus flore pleno.	Campanula medium.
Ditto Heddewigii laciniatus flore pleno.	Fenzlia dianthi—flora.
Clendula officinalis meteor.	Torenia baillionii.

Celosia pumila President Thiers.

The campanula has failed to flower yet, and the Torenia was almost a failure : the others were successful and proved to be very superior varieties.

89. After a fair trial hyacinths again proved unsatisfactory. I do not think they can be successfully grown in this part of India.

Hyacinths.

90. A number of other bulbs were also tried, but little can be said for or against them till further trial has been given.

91. The following trees, shrubs, and plants have been added to the garden collection during the year :—

New trees and plants.

Trees—

Acronychia baueri.	Ficus macrophylla.
Anogeissus latifolia.	Do. roxburghii.
Araucaria bidwelli.	Inga pulcherrima.
Balsamodendron sp.	Trewia midiflora.
Bignonia catalpa (syringæ—flora).	Laceopetalum tomentisum.
Cordia angustifolia.	Olea ferruginea.
Do. ferruginea.	Do. myrtifolia.
Castania vesca.	Quercus in-cana.
Colastrus rufus.	Schizolobium excelsum.

Shrubs—

Abutilon darwinii.
Adbadoda esca.
Aphelandra fulgens.
Caseria tomentosa.
Cupressus elegans.
Callistemon lanceolata.
Cycas circinalis.
Cupania sp.
Clendrodron pyramidale.
Chendrospermum deutalum.
Dichrostachys cinera.
Deutzia gracilis.
Eugenia nerifolia.
Eriacocus glaucescens.
Euonymus japonica.
Gymnospera sp.
Hemidesmus iaponicus.
Hymenopyramis brachiata.
Ixora spectabilis.
Do. lobbii.
Do. Prince of Orange.
Do. Griffithsii.
Jasminum sp.
Leea sp.
Musa ensete.
Pittosporum robustum.
Poinsettia pulcherrima flore pleno.
Solanum Coriaceum.
Sambucus ruber (Elder).
Thuja glauca vera.
Larus sp.

Climbers—

Allamanda nobilis.
Bougainvillea loteritia.
Combretum decandrum.
Delachampia madagascariensis.
Hiptage sp.
Iponiœa ialapa.
Rubus roscefolius.

Herbaceous plants—

Alternanthera sp. (from Java).
Artemesia sp.
Asystasia cheleonoides.
Begonia calycinum.
Dianella sp.
Dieffenbachia illustris.
Ditto imperialis.
Erythrina laurifolia.
Eupatorium sp.
Eranthemum nobilis.
Spironema fragrans.

Bulbs and tubers—

Allium sp.
Brunsriegia Josephine.
Calla Albo-maculata.
Nine caladiums.
Hedychium sp.
Koempferia rotunda.
Lilium candidum.
Maranta setosa.
Do. prasina.

Succulents and cacti.—

Euphorbia monstrosum.
Do. humilis.
Yucca aloœfolia gigantea.
Ditto rosea.
Ditto pendula.
Do. quadricolor.
Do. brevifolia.
Do. treculiana.
Do. Albo spica.

New crotons.—

Croton angustifolia.
Do. aurea phœnecia.
Do. Cunninghamii.
Do. Gibsoni.
Do. Macafeeanus.
Do. McArthur's, sp. No. 86.
Do. newtonii.
Do. Prince of Wales.
Do. McArthur's sp. No. 6.
Do. Hendersonii.
Do. majesticum.
Do. appendiculata.
Do. elegans var.
Do. ditto ditto.
Do. Stanleyii.
Do. trilobus var.
Do. torquatus.
Do. Wrightii.
Do. Washingtonii.
Do. Shuttleworthii.
Do. Oreophanus.
Do. Dormaniana.
Do. Chelsoni.
Do. rugatus.

Palms—

Areca Catechu.
Acerocomia sclerocarpa.
Sabal macrophylla.
Do. Blackburniana.
Borassus Madagascariensis.
Latania Barbonica.
Cacus plumosa.
Chamœrops Ghiesbrightiana.
Do. longifolia.
Do. Richiana.
Phœnix Canariensis.
Do. cycadœfolia.
Do. senegalensis.
Do. farinifera.

Ferns—

Nicrolepia platiphylla.
Nephrodium arbuscula.
Pteris quadrianrita.
Do. pellucens.
Do. geranifolia.
Nephrodium diplzarium.
48 varieties of roses.
10 varieties of coleus.
29 choice named chrysanthemums.

(c) *Distribution.*

92. The number of trees and plants sold and sent out during the year show a slight increase over last year, but there is a falling off in the number of rose plants and cuttings.

The numbers are—

	Sold.	Distributed gratis.	Total.
Ornamental trees and plants	6,512	1,305	7,817
Rose plants	1,328	9	1,337
Cuttings of sorts	355	106	461

The approximate value of the gratis distributions under these three headings is Rs. 346, which, added to the amount for fruit trees, aggregates Rs. 486-1-0.

93. I regret to say the stock of roses was not equal to the demand. This was brought about by heavy losses among the budding stocks through having the plant them out under unfavourable circumstance, the season being greatly against such work. A larger stock is under preparation this season.

IV.—Arboriculture.

Carob.

94. The old carob trees continue to die out, and those left have very little fruit on them this year.

The repeated efforts made to propagate this tree by inarching and budding have met with no success. Out of a large number tried not a single graft or bud have taken.

Eucalypti.

95. The condition of the plantations of Eucalypti is satisfactory. A little ripe seed has been collected from some trees of Eucalyptus citriodora in the garden; this is valuable, as seed is rather difficult to get even in Australia.

96. To the three species which have proved suited to the plains of India, a fourth has, I think, been found in Eucalyptus paniculata, as a small block of it in the garden has made almost equal growth with one of Eucalyptus resinifera planted at the same time.

97. The two kinds planted out last year for trial have failed.

(*a*). *Introduction of new kinds.*

Eucalypti.

98. Seed of Eucalyptus diversicolor and ficifolia was procured from Mr. Creswell of Melbourne and of each a few plants have been raised. The former is known as "The Karri Gum" of South-West Australia. Baron Von Muller describes it as "a colossal tree, exceptionally reaching the height of 400 feet, with a proportionate girth of the stem." "Fair progress is shown by the young trees, planted even in dry exposed localities in Melbourne. The shady foliage and quick growth of the tree promise to render it one of our best for avenues."

99. Eucalyptus ficifolia is also a native of South-West Australia, but is more of a shrub than tree, and is prized for the beauty of its magnificent trusses of crimson flowers. Should it succeed here it will prove a valuable addition to our stock of flowering trees.

100. From seed kindly presented by Mr. Vincent of Lahore, a small stock of plants of Eucalyptus corynocalyx has been raised. This species is a native of South Australia, where, on account of its sweet foliage, it is called "The sugar eucalyptus." The foliage is said to be acceptable to sheep and cattle, so that if it succeeds as well in India as either rostrata or resinifera have done, it will prove a valuable forage tree.

(*b*) *Arboricultural nursery.*

Central arboricultural nursery.

101. The area of the arboricultural nursery is the same as last year.

102. Transplanting operations were conducted under slightly more favourable conditions than in the preceding year, but it was not found possible to get the whole of the work done in the short period covered by the monsoon rains, and a number of deaths resulted from moving the trees in dry weather, besides the necessity of doing such work with the aid of artificial irrigation increased the working expenses.

Jacks.

103. Owing to the small demand a number of jacks (Artocarpus integrifolia) had grown too large to transplant and travel any distance. I therefore resolved to plant an avenue of them on the principal roads in the nursery. This took

77 trees, the remaining large ones being sold to cultivators and others close by who were glad to get such good plants at two annas each. Fruit of this tree is scarce and always fetches a good price.

'Screw beans' (Prosopis pubescens).

104. I regret to say all the plants of Prosopis pubescens died off soon after the rains set in. A few were transplanted, but the greater portion were left where sown; in each case the plants failed.

Imported carob seed.

105. This year's supply of seed germinated still worse than that of the preceding year; only 100 small plants are now alive.

106. Last year's plants are doing fairly well; a few are three feet high, and are strong and healthy, 435 are at present living.

Tendu and chiraunji.

107. The plants of tendu and chiraunji which have survived seem at last to be making progress: if sown where they intended to grow, both would no doubt succeed in this district; tendu is at present doing best.

Pithecolobium saman.

108. The pithecolobiums planted out in 1879 continue to make satisfactory progress. In some trees a few points have died off, otherwise they are doing well. The girth of one of the largest at three feet from the ground measures 11½ inches; it is about 12 feet high, with an equal spread of the branches.

Protecting seedlings from frost.

109. In August, 1880, 'arhar' was sown for the purpose of ascertaining its suitability for protecting seedlings from frost in the cold season. The seed was sown in lines eight feet apart, the plants being left from 8 to 12 inches apart in the lines. Owing to want of rain they did not make much progress the first year and afforded little shelter. This year, however, they were really useful; in order to afford the young trees sufficient room, it was necessary to frequently prune away the side shoots of the arhar plants which caused them to run up in height, and by the cold season their tops were well grown together overhead, and afforded excellent shelter to the young mango seedlings below.

Near young trees it is a clearer and more wholsome plant than the castor, but has the disadvantage of taking a longer time to be effective.

110. The following table shows the kinds and numbers in stock at the end of last year and this, as well as those sent out and raised during the year :—

Name of plant.	Total in nursery on 31st March, 1881.	Distributed during 1881-82.	Died during 1881-82.	Balance on hand on 31st March, 1882.	Raised during 1881-82.	Total in nursery on 31st March, 1882.
Mango	23,300	3,104	4,146	16 050	3,300	19,350
Ambili	8 621	57	1,764	6,800	3,000	9,800
Mowha	8 250	25	2,225	6,000	1,100	7,100
Gular	10,562	202	2,610	7,750	2,500	10,250
Kathal	870	182	188	500	...	500
Bahera	290	...	...	290	600	890
Eucalyptus rostrata	800	335	...	465	...	465
Ditto resinifera	480	98	22	360	...	360
Jaman	15,200	436	3,464	11,300	2 300	13,600
Pakar	11,750	31	1.719	10,000	1,600	11,600
Pipal	6.532	186	1,146	5,200	2,500	7,700
Pithecolobium samun	60	40	...	20	400	420
Gosum	200	...	...	200	...	200
Arjun	30	...	...	30	...	30
Shahtut (morus multicaulis)	6,500	...	400	6,100	...	6,100
Carob (from unported seed)	535	...	100	435	100	535
Do. (acclimatised seed)	1,300	40	460	800	...	800
Bargad	425	139	46	240	2,200	2,440
Bel	2,650	...	50	2,600	1,000	3,600
Khirni	1,700	...	50	1,650	...	1,650
Tendu	200	...	75	125	50	175
Chiraunji	400	...	50	350	550	900
Lasora (Saháranpur seed)	400	...	...	400	...	400
Do. (Lucknow seed)	1,800	...	...	1,800	...	1,800
Amra	...	...	...	...	1,000	1.000
Kaitha	...	...	...	...	1,600	1,600
Total ...	102,855	4,875	18,515	79,465	23,800	103,265

111. Owing to the large stocks on hand and the absence of indents fewer trees were raised this year than last.

(c) Exotic plantation.

112. The following additions were made to the exotic plantation :—

	Number added.	Number now alive.	Remarks.
Cananga odorata	7	2	Have died down to the ground.
Ficus eburnea	4	4	Injured by cold.
Garcinia roxburghii	6	6	Doing well.
Catalpa bignoniolides var. speciosa	4	4	Doing well.

113. The numbers and condition of the kinds previously planted are as follows :—

	Number alive last year.	Number alive this year.	Remarks.
Swietenia mahogani (Mahogany)	16	16	Making slow progress.
Owenia cerasifera (sweet plum)	4	4	Doing well.
Rhus Thunbergii	15	14	Making slow progress.
Pterocarpus marsupium	4	4	Doing well.
Antidesma Dallachiana	4	4	Moderate progress.
Spatiodea campaaulata	2	1	One dead. The other dead down to ground, but sprouting again
Fraxinus pubescens	4	1	Three dead, other healthy.
Eucalyptus resinifera	11	11	Doing well.
Ditto rostrata	33	33	Doing well.
Pithecolobium saman	60	67	Seven new trees planted to fill up vacancies. Old trees doing well.
Arabian date-palms	22	20	Doing well.
Brachychiton populneum	4	4	Doing well.

(d) Distribution.

114. The year's distribution is as follows :—

Trees.

To the Collector of Hamírpur—

112 bargad.
220 jamun.
130 mango.

To the Collector of Basti—

540 mango.
40 pithecolobium saman.
40 carobs.

To the Municipality of Lucknow—

59 pipal.
26 bargad.
43 gular.
45 tamarinds.
27 pakar.
6 jamun.
9 mango.
8 Eucalyptus resinifera.

To Wingfield Park, Lucknow—

56 Eucalyptus rostrata.
3 pakar.
3 jamun.
1 bargad.
1 jack (kathal).

To the Horticultural Garden, Lucknow—

1,922 mango seedlings.
33 jack trees.
144 Eucalyptus rostrata.
55 ditto resinifera.

To the Deputy Commissioner of Lucknow—

115 pipal.
159 gular.
100 Eucalyptus rostrata.
150 mango.
205 jamun.
25 mowha.

To R. A. Lines, Lucknow—

12 pipal.
12 amarind.
12 mango.

To Director, Department Agriculture and Commerce, Cawnpore—

10 Eucalyptus rostrata.
10 ditto resinifera.

To District Superintendent of Police, Lucknow—

50 Eucalyptus plants.

Besides the above, the following were sold to private individuals :—

148 jack trees.
341 mango.
1 pakar.
2 jamun.
2 amla.

Seed.

115. To the Collector of Basti—

2 lbs. Inga dulcis seed.

To the Superintendent, Botanical Gardens, Saháranpur—

30 lbs. Inga dulcis seed.

Kagzi limes.

116. Out of 7,500 kagzi lime trees reported on hand last year 3,030 were sent to jails in the North-Western Provinces and Oudh, and 64 sold to private individuals; 4,406 are still on hand.

Apprentices.

117. Owing to the resolution to close or reduce the scale of the nursery, and the consequent reduction of establishment, two of the apprentice boys were transferred to the horticultural garden in January last. The other two will be retained till November, when, in the absence of other arrangements, they will also be transferred to the horticultural garden. The two transferred only remained in the garden for two months and then left without giving any reason for doing so.

Expenditure on arboricultural nursery.

118. The estimated expenditure on the arboricultural nursery was Rs. 1,744 and the total actual expenditure was Rs. 1,403-2-3, or Rs. 340-13-9 less than the estimate.

Receipts.

119. The receipts realized and paid into the Lucknow treasury amounted to Rs. 305-8-3, which added to Rs. 6 adjusted by transfer account for lime trees supplied to Fatehpur jail, makes the total receipts Rs. 311-8-3.

120. A detailed statement of expenditure and receipts accompanies this report.

V.—Financial results.

Budget.

121. The total estimated receipts for 1881-82 amounted to Rs. 9,500. The total actual receipts were Rs. 9,591,2-9 or Rs. 91-12-9 over the estimate.

The total sanctioned expenditure was Rs. 13,500, the whole of which was spent. In this is included Rs. 1,500, pay of Superintendent transferred from nazul to horticultural garden budget.

Details of increase or decrease over budget estimate.

122. For some reason not explained the interest on Government notes has not been paid.

The receipts from rent of land were more by Rs. 123-8-0.

The receipts from subscribers were less by Rs. 180.

The sale of garden produce as detailed in the financial statement amounted to Rs. 8,848-4-9 or Rs. 186-4-9 over the estimate. Compared with last year there is a decrease of Rs. 906-14-0 for the same produce.

The total receipts from all sources are less by Rs. 974-1-6 than those of last year.

123. I much regret having to record this decrease of income, which, however, is owing entirely to causes beyond control. Most of the causes have already been explained in the body of this report; the decreases chiefly occur on account of sale of fruit (owing to poor mango crop), imported seeds (less demand), fruit trees (limited stocks), interest on Government notes (not paid).

Account with seedsmen.

124. Accounts with seedsmen—Messrs. Landroth and Sons, Philadelphia :—

	Dollars.	Cents.
Balance in favor of Landreth and Sons	0	27.
Their bill for seeds	178	97
Total	179	24
Remitted in 1881-82	197	27
Balance in favor of horticultural garden	18	3

Messrs. Sutton and Sons—	£	s.	d.
Balance due to Sutton and Sons	0	17	8
Their bill for seeds	21	7	8
Total	22	5	4
Remitted in 1881 82	21	3	9
Balance due to Sutton and Sons	1	1	7

Subscribers.

125. The number of subscribers during the year was—

First class	8
Second class	9

Apprentice malis.

126. Out of the sixteen apprentice boys in the garden at the beginning of the year two left and one was dismissed; the latter had been in the garden about a year, but took no interest in his work, the other two had only been employed a few months when they left; no reason was given for leaving.

Three other boys were taken on in place of the above, but two had to be dismissed after a few months' trial, as they gave no hope of turning out well. The third boy was transferred from the Wingfield Park where he had been training for about three years. He takes great interest in his work and promises to turn out well.

127. From the above it will be seen that the changes of the year were among the newer hands only. The older boys, I am glad to say, hold to their work, in which they take a satisfactory interest, and continue to make fair progress in acquiring a knowledge of their duties.

128. The year closes with 14 boys on the roll, or two short of the full number; suitable boys are being inquired for to fill the vacancies.

Horticultural show.

129. The annual flower-show, which was considered the best ever held here, took place on the 2nd of March. With the exception of fruit, all classes were largely represented.

130. Most of the vegetables shown were good both in size and quality: improvement was most marked in the latter point as compared with previous shows. There can be no question that these horticultural shows have done good in teaching malis that not size but kind and quality are the chief points in good vegetables.

131. Both flowering and pot plants were well represented; in some classes the enterers were numerous and competition keen.

132. The display of cut flowers was also good, chiefly annuals, as the roses were considerably below previous year's exhibits, both in size and quality.

133. The account of the show stands thus :—

Receipts.

	Rs.	a.	p.
Balance from last year	239	1	11
Contributed by European and native gentlemen	187	0	0
„ by Municipality of Lucknow	50	0	0
Realized by sale of tickets	57	4	0
Total	533	5	11

Expenditure.

	Rs.	a.	p.
Distributed in prizes	261	0	0
Printing schedules and tickets	23	8	0
Miscellaneous expenses	16	13	9
Balance with Deputy Commissioner	232	0	2
Total	533	5	11

Weather.

134. The weather experienced during the year, particularly in the rainy season, was most unfavorable to the garden generally; the late and scanty rainfall delayed many operations and interfered with work of all kinds. Owing to the same cause the fruit trees and trees and plants generally failed to make the growth and progress usual in normal seasons.

Seeds received.

135. The following seeds have been received during the year:—

From the Superintendent, Botanical Garden, Calcutta—

Nelumbium speciosum.
Nymphœa alba.
Do. cyanea.
Sabal minor.
Do. adansonii.
Do. palmetta.
Licula spinosa.
Do. peltata.
Livistona mauritiana.
Eschynomense aspera.
Do. paludosa.
Coix lachryma.
Phœnix sylvestus.
Arecca madagascariensis.
Arenga saccharifera.
Areca catechu.
Calodendron capense.

From the Superintendent, Botanical Garden, Saháranpur—

Onphalocles linifolia.
Petunia mixed.
Loosa hispida.
Do. tri-color.
Lamarkia aurea.
Nycterinea selaginoides.
Thuja orientalis.
Cryptomeria Japonica.
Ardisia humilis.
Melanopodium sp.
Chamœrops fortunei.
Lallemantia iberica.
Pinus longifolia.
Sapotacœ sp.
Cupressus torulosa.
Do. sempervirens.
Do. funebris.
Acacia catechu.
Flemengia sp.
Hymenopyramis brachiata.
Albizzia lucida.
Linocera macrophylla.
2lbs. lucerne grass seed.

From Mr. A. P. Webbe, Barout, Meerut—

Four kinds of stocks.
Viburnum opulus.
Dalbergia lanceolaria.
Callophyllum inophyllum.
Ipomœa Horsfallicæ.
Anona cherimolia.

From Dr. Bonavia—

Hybrid amaryllia.
Scilla campanulata.
Rasins.
Ardisia sp.
Ardisia crenulata.
African dates.

From Superintendent, Taj Garden, Agra—

Prosopis spicigera.

From Major Wood, Conservator of Forests, Oudh—

Conocarpus latifolia.
Cratœva religiosa.
Saccopelatum tomentosum.

From Mr. Creswell, Melbourne—

Eucalyptus rostrata
Do. diversicolor } By purchase.
Do. ficilis
Kentia Forteriana
Do. Canterburyana } Presented.
Do. Belmoriana

From Messrs. C. Platz and Sons, Erfurt, Prussia—

Five kinds of balsams
Eight do. of abutilons
Nine do. of yuccas
Four do. of nelumbiums
Three do. of nymphæas
28 packets miscellaneous seeds.
} By purchase.

From Mr. Ernest Benary, Erfurt, Prussia—

34 packets of various seeds (by purchase).

From Mr. G. W. Bartlett, Calcutta—

Frederika guillaumii.
Crinum amœnum.
Brinsvegia Josephinœ.

From Captain Bailey, Conservator of Forests, Dehra Dún—

Dalbergia lanceolaria.

From Mr. F. A. Vincent, Assistant Conservator of Forests, Lahore—

Eucalyptus corynocalyx (sugar gum).

From Mr. Barrie, Lucknow—

Hibiscus of sorts.

From Mr. Beck, Cashmere—

120 packets of indigenous seeds.

From Mr. A. Parsons, Ajmere—

Delachampia Madagascariensis.

From the Director, Department of Agriculture and Commerce, Cawnpore—

5 lbs. of Carob seed from Cyprus.

From Mr. Jules de Cock, Ghent—

6 kinds of vegetable seeds.

Plants.

136. From the Superintendent, Botanical Garden, Calcutta—

A collection of rare and ornamental plants numbering 80.

From Mr. G. W. Bartlett, Calcutta—

A collection of rare and ornamental plants numbering 56.

From the Superintendent, Botanical Garden, Saháranpur—

A collection of shrubs, trees, &c., numbering 234.

A lot of orchids.

From Mr. R. Nicholson, Kantit Estate, Mirzapur—

Two baskets of ferns.

Roots of deadly-nightshade. (Atropa Belladonna).

From the Secretary, Agri-Horticultural Society of India, Calcutta—

Garden share of plants numbering 16.

6 tubers of Cyperus esculentus.

100 Crotons of kinds.
2 New and rare plants. } By purchase.
21 Mangos of kinds.

From the Superintendent, Government Botanical Garden, Ootacamund—

12 kinds of ferns.

From the Superintendent, Taj Garden, Agra—

9 plants and trees of sorts.

From Mr. T. R. Griffith, Kotagiri Nilgiris—

4 kinds of Oxalis.

6 other plants and some Narcissi bulbs.

38 kinds of rose cuttings.

From Mr. P. Barrie, Lucknow—

A lot of Oxalis bulbs.

From Mr. G. Reid, Lucknow—

12 Heliotrope plants.

A lot of strawberry plants.

From Mr. Cornelius, Lucknow—

Yucca variegata.

From Mr. J. Gannon, Lucknow—

10 kinds of rose cuttings.

From Mr. E. Buck, C.S., through Secretary, Agri-Horticultural Society of India—

A collection of new and ornamental plants numbering 14.

From Mr. G. Bird, Rae Bareli—

Iris and Narcissus bulbs.

From Major Jacob, Jeypore—

A bundle of Lantana cuttings.

From Mr. A. Parsons, Ajmere—

Coleus and begonia cuttings.

4 new and rare plants.

From Mr. W. Bull, Chelsea, London—

29 new chrysanthemums.

From Messrs. Barr and Sugden, London—

A collection of bulbs (by purchase).

From Mr. J. W. Barwise, Lucknow—

A number of Alocasia and choice caladium bulbs.

From Dr. Bonavia, Florence—

Bulbs of Amaryllis formossimus.

Seeds sent out gratis.

137. To Superintendent, Botanical Garden, Natal—

1 packet Deodar seed.

To Mr. Jules de Cock, Ghent—

½lb. Phœnix acaulis seed.
14 ozs. Calamus Roxburghii seed.
12 ozs. Deodar seed.

To the Honorary Secretary, Acclimatization Society of Queensland—

12 packets tree and shrub seeds.
1 packet pinus longifolia
1 do. conocarpus latifolia.
1 do. prosopis spicigera.

To Mr. E. Tidmarsh, Botanical Garden, Grahams Town, South Africa—

18 packets tree and shrub seeds.
A collection of Cashmere seeds.

To Major Marsh, Kasauli—

20 packets tree and shrub seeds.

To the Superintendent, Botanical Garden, Saharanpur—

1 packet Poinciana regia.
1 do. Eucalyptus diversicolor.

To Mr. A. Parsons, Ajmere—

1 packet Poinciana regia.
1 do. Eucalyptus diversicolor.

To Mr. T. T. Bond, Cawnpore—

28 packets trees and shrub seeds.

To Superintendent, Royal Botanical Garden, Calcutta—

A collection of flower seeds.

To Mr. J. W. Barwise, Mount Abu.

One packet of Michelia champaca.

To Mr. Charles Ford, Superintendent, Government Garden, Hong Kong.

A collection of tree and shrub seeds.
One packet deodar seed.

To Dr. Bonavia, Etáwah.

A collection of tree and shrub seeds.

To the Maharaja of Bulrampur.

½ lb Shorea robusta seed.

To Mr. Ernest Benary, Erfurt, Prussia.

Twelve ounces deodar seed.

To Mr. Keit, Curator, Botanical Garden, Natal.

A collection of Cashmere seeds.

To Mr. R. W. Lynch, Curator, Botanical Garden, Cambridge.

A collection of Cashmere seeds.

To Mr. F. W. Burbidge, Curator, Botanical Garden, Dublin.

A collection of Cashmere seeds.

To Mr. A. P. Webbe, Barout, Meerut.

One packet Torenia fournieri seed.

To Mr. Bartlett, Calcutta.

A collection flower seeds.

By request, a bottle of alubokharas was supplied to the Director, Royal Botanical Gardens, Kew, for the garden museum.

M. RIDLEY,
Supdt., Horticultural Garden, Lucknow.

Statement showing the Receipts and Expenditure of the Lucknow Horticultural Garden during the year ending 31st March, 1882.

Receipts.	Actuals of 1880-81.	Sanctioned estimate for 1881-82.	Actuals of 1881-82.
	Rs. a. p.	Rs. a. p.	Rs. a. p.
Interest on Government notes	108 0 0	108 0 0	...
Rent of land	339 11 6	250 0 0	443 8 0
Subscriptions	352 0 0	480 0 0	300 0 0
Total ...	799 11 6	838 0 0	743 8 0
SALES.			
On cash payment.			
Fruit trees	946 14 0	...	765 6 9
Vegetable and flower seeds acclimatized	1,013 4 0	...	912 5 9
Imported	1,358 10 0	...	1,160 3 0
Ornamental plants and trees	3,037 8 3	...	3,082 0 9
Cut flowers	299 11 3	...	255 6 3
Vegetables	237 5 3	...	219 8 6
Fruit	1,224 1 0	...	870 12 0
Wood and grass	...	...	34 8 0
Miscellaneous	1,637 13 0	...	1,510 15 3
Total cash payment on sales ...	9,755 2 9	8,662 0 0	8,811 2 3
Total receipts in cash ...	10,554 14 3	9,500 0 0	9,554 10 3
Credit account.			
Imported seeds	11 0 0	...	...
Acclimatized seeds	...	...	37 2 6
Total receipts in cash and credit ...	10,565 14 3	9,500 0 0	9,591 12 9

Expenditure.	Actuals of 1880-81.	Sanctioned estimate for 1881-82.	Actuals of 1881-82.
	Rs. a. p.	Rs. a. p.	Rs. a. p.
Superintendent	2,875 0 0	3,000 0 0	3,000 0 0
Writers and others	357 8 0	444 0 0	358 5 9
Gardeners and assistants	1,887 11 3	1,948 0 0	1,896 3 0
School for native gardeners	564 7 0	700 0 0	623 9 9
Variable labor	1,748 1 3	2,000 0 0	1,698 3 6
Purchase and carriage of plants and seeds ...	2,660 14 3	2,200 0 0	2,548 5 3
Purchase of dead and live stock	782 12 11	368 0 0	632 7 7
Ditto of manure	70 5 6	100 0 0	104 0 0
Petty construction and repairs	765 6 9	400 0 0	410 4 3
Service stamps	121 1 6	140 0 0	114 13 0
Miscellaneous	2,241 11 7	2,200 0 0	2,113 11 11
Total ...	14,075 0 0	13,500 0 0	13,500 0 0

Statement showing the Receipts and Expenditure of the Arboricultural Nursery, Lucknow, during the year ending 31st *March,* 1882.

Receipts.	Amount.			Expenditure.	Amount.		
SALES.							
On cash payment—	Rs.	a.	p.		Rs.	a.	p.
Plants	159	8	9	Gardeners and assistants	611	9	3
Seeds	2	8	0	Variable labor	641	0	6
Fruit	21	0	0	Purchase of manure	3	15	0
Chain pump	90	0	0	Ditto of seeds and plants	23	6	0
Surplus tiles	32	7	6	Irrigation...	60	8	0
				Miscellaneous	62	3	6
Total receipts in cash ...	305	8	3	Exotic plantation	0		0
On credit—							
Plants	6	0	0				
Total receipts in cash and credit ...	311	8	3	Total ...	1,403	2	3

M. RIDLEY,

Supdt., Hort. Garden in charge Arb. Nursery, Lucknow.

ORDERS OF GOVERNMENT.

No. 1345 of 1882.

FROM

OFFICIATING SECRETARY to GOVERNMENT,

NORTH-WESTERN PROVINCES AND OUDH;

To

THE DIRECTOR of AGRI. AND COMMERCE,

NORTH-WESTERN PROVINCES AND OUDH.

Dated Naini Tal, the 31st July, 1882.

SIR,

REV. DEPT. I AM directed to acknowledge your letter No. $\frac{880 \text{ A.}}{\text{II.}}$, dated the 30th June last, with which you submitted the annual report on the Horticultural Gardens at Lucknow for the year ending the 31st March, 1882.

2. The sanctioned grant for the Gardens, which was Rs. 13,500, was all spent, and the receipts amounted to Rs. 9,662-10-3. The net cost to Government was therefore Rs. 3,837-5-9 only, being little more than the Superintendent's salary. This financial result was satisfactory, and you remark that, considering their extent and the work they transact, these gardens are by far the most economically administered of any of which you have knowledge.

3. The usual experiments with different kinds of fruits and flowers were continued, and of the issue of these you have given a full and clear summary. The season was not very favourable, and sales of fruit trees, imported vegetable seed, acclimatized flower seed, and cut flowers and fruit slightly fell off as compared with those of the preceding year. The fruit crops proved highly remunerative, the average profits per acre having been more than Rs. 34.

4. Mr. Ridley claims that the acclimatized flower seeds grow better than those procured from England, and you remark that it is to be regretted that public gardens do not indent for their supplies more generally on the Lucknow Garden. I am to suggest that you should endeavour to make known the quality of the Lucknow flower seeds to officers in charge of public gardens and to the public generally. The distribution of small sample packets gratis might perhaps be of advantage in this way, and afford a practical test of the merits of the Lucknow as compared with English seeds.

5. The arboriculture nursery is said to have proved a failure. It would seem that for some unexplained reason indents for young trees were very small, only 4,875 having been distributed during the year, while the number in stock at the commencement was no less than 102,855. If the difficulties in the way of distribution cannot be overcome, the expediency of continuing the nursery will doubtless receive due consideration from you.

6. The education of apprentices should be persevered with. Those of the apprentices who become skilful and careful gardeners will probably have no difficulty in finding employment.

7. The success of the annual show, and its small cost Rs. 50 only, reflect great credit on Mr. Ridley.

8. In conclusion, the management of the Gardens during the year may be pronounced highly successful, and the commendation of Government for it should be communicated to Mr. Ridley.

I have the honor to be,

SIR,

Your most obedient servant,

J. R. REID,

Offg. Secy. to Govt., N.-W. Provinces and Oudh.